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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/085,866	02/27/2002	Zhizhang (John) Chen	10013802 -1	1660

7590 10/17/2003

HEWLETT-PACKARD COMPANY  
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EXAMINER

HU, SHOUXIANG

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 10/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/085,866

Applicant(s)

CHEN ET AL.

Examiner

Shouxiang Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-12 and 20-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 and 5. 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 1-12 and 20-22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 7.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 18 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 18 recites the subject matters that the recited emission layer is formed through a rapid thermal formation process; however, a rapid thermal process (RTP) normally refers to a thermal process with a substantially high change rate in temperature during the heating up, and the disclosure lacks an adequate description regarding how the recited SiO<sub>2</sub> material and the recited SiO<sub>x</sub>N<sub>y</sub> material can be both formed during the same RTP.

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4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 13-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13 recites the limitation of "a rapid thermal formation process", but lacks a clear definition for it. It is not clear whether it means the heating up process is rapid, or it is the whole formation process that is rapid.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 13, 18 and 19, insofar as being in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'986 (JP 2000-76986, 3/2000) in view of US'080 (US 6,249,080).

JP'986 discloses a method for forming an emitter (see Figs. 1a-2), comprising the steps of: forming a patterned oxide layer (2) to define an emission area upon an electron supply layer (1); forming an emission layer (SiO<sub>2</sub>) within the emission area with a thermal formation process; and forming a thin metal layer (3).

Although JP'986 does not expressly disclose that the thermal formation process can be a rapid one, US'080 teaches (see Fig. 3) to form an emission layer (6) with a

rapid thermal formation process for suppressing entrainment oxidation and/or enhancing emission efficiency (see col. 7, lines 50-54, and col. 41-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the rapid thermal formation process of US'080 into the method of JP'986, so that a method for forming an emission layer with suppressed oxidation and/or enhanced emission efficiency would be obtained.

Regarding claim 18, it is noted that the emission layer (12a) in JP'986 can have a thickness in the range of 50 to 200 Angstroms (see the attached machine translation as a reference in English), which can be regarded as being formed of a lower portion of SiO<sub>2</sub> with a thickness of about 20 Angstroms and an upper portion of SiO<sub>2</sub> with a thickness of about 30-130 Angstroms; and the upper portion of SiO<sub>2</sub> therein can be readable as a SiO<sub>x</sub>N<sub>y</sub> with y=0.

Regarding claim 19, US'080 further teaches the method of forming the emission layer can be performed as part of an integrated circuit formation process to form the emitter as part of an integrated circuit (See Fig. 18) that naturally includes an emitter control circuitry (at least the interconnections to the individual emitters 10).

8. Claims 14-17, insofar as being in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'986 (JP 2000-76986, 3/2000) in view of US'080 (US 6,249,080), as applied to claims 13, 18 and 19 above, and further in view of US'417 (US 5,760,417).

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The disclosures of JP'986 and US'080 are discussed as applied to claims 13, 18 and 19 above.

Although JP'986 and US'080 do not expressly disclose that the method can further comprises a step of forming a metal contact structure, one of ordinary skill in the art would readily recognize that a metal contact structure can be preferably formed for improving the contact to the top thin metal layer, as evidenced in US'417 (see the metal contact structure 807 and the top thin metal layer 808 in Fig. 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the metal contact structure of US'417 into the above method collectively taught by JP'986 and US'080, so that a method for forming an emission layer with improved contact to the top thin metal layer would be obtained.

Regarding claim 17, the method of claim 14, the metal contact structure (807) of US'417 can be regarded as comprising multiple metal layers corresponding to the bottom portion, the top portion and other portions of the metal contact structure.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH  
October 6, 2003

A handwritten signature in black ink, appearing to read 'Shouxiang Hu', written in a cursive style.

**SHOUXIANG HU**  
**PRIMARY EXAMINER**